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EDITORIAL

BISE and the Engineering Sciences

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The development of our journal in the last year has been very encouraging. We have received over 220 submissions from authors worldwide, and the ISI impact factor 2014 reached 1.7. Overall, the journal and the community are developing favorably and we appreciate the participation and impact of a new and outstanding generation of faculty members, which is important for a prospering community.

While the field is growing, the list of research topics is also growing, which makes the core of our discipline harder to embrace and demarcate. For instance, the issue 6 of our journal last year featured two research notes and a discussion on "grand challenges" in BISE research (Becker et al. 2015; Barbian and Mertens 2015; Eymann et al. 2015). Apart from a broad collection of research challenges in both research notes, the article by Becker et al. (2015) also summarized challenges for the academic community. Some of the top-ranked challenges concern the identity of the discipline: identifying IS as an academic discipline, rethinking the theoretical foundations of the IS discipline, mastering the methodological breadth/richness, etc.

These challenges are not surprising for a field which deals with information technology and information systems. 30 years ago, most BISE research was either rooted in software and data engineering within organizations, or in operations research. The technical developments over the past decades were so rapid that our community adopted many new topics and new methodologies. The range of topics published in our journal today ranges from business process management to electronic markets, social network analysis, and IT governance.

On a high level, the design, development, and management of *socio-technical systems* has been and still is a unifying theme in our journal. But it is also clear that the different topics draw on different theories and technologies. Furthermore, they require different research methods. The reorganization of the BISE editorial board in 2013 along seven departments tried to address the increasing diversity of topics, theories, technologies, and methods used. When we look at the papers published in these departments, they cover a broad range of topics from engineering to scientific theories. This continuum can probably be best characterized as *engineering science,* as it was described by (Fung and Tong 2001):

> "Engineering is quite different from science. Scientists try to understand nature. Engineers try to make things that do not exist in nature. Engineers stress invention. To embody an invention, the engineer must put his idea in concrete terms, and design something that people can use. That something can be a device, a gadget, a material, a method, a computing program, an innovative experiment, a new solution to a problem, or an improvement on what is existing.

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> Since a design has to be concrete, it must have its geometry, dimensions, and characteristic numbers. Almost all engineers working on new designs find that they do not have all the needed information. Most often, they are limited by insufficient scientific knowledge. Thus they study mathematics, physics, chemistry, biology and mechanics. Often they have to add to the sciences relevant to their profession. Thus, *engineering sciences* are born."

It is typically not the theories in physics and chemistry that many of us draw on for their research. However, in much of our work we use and extend theories from computer science (from data science to formal methods), economics, management, mathematics (including statistics and operations research), psychology, and sociology (Heinrich et al. 2011). These theories help us understand and predict how people adopt information systems, how they use these systems, and how information systems use impacts their organizations and our societies. In contrast to pure theory development and testing, many BISE articles design IS artifacts, evaluate their impact, and then contribute to theory drawing on the empirical evidence. These articles are trying to "engineer the future of information systems" rather than "understand the past."

Although companies such as Facebook, Airbnb, and Uber were only created a few years ago, they are driving business innovations using IT. Research should not shy away from these developments and also design IS artefacts. There should be room to test exciting ideas in a short timespan, e.g., through rapid-prototyping. In many circumstances, the artifact itself offers a significant contribution which yields valuable insights (how something can be done) without an extensive empirical evaluation. A solid empirical evaluation of a novel IS artifact is challenging. Asking for the design, implementation, and evaluation of novel artifacts in a single manuscript might be too demanding and have the potential to discourage authors to work on design research. In other words, we need to consider the evaluation of different types of contributions if we believe the design of IS artifacts is vital for our community and for the field.

Independent of the level of empirical evaluation, it is important for our research and teaching to understand which theories are fundamental to different lines of our research. Some of our papers cite prospect theory, others transaction cost theory, complexity theory, or auction theory. Unfortunately, the terms "science" and "theory" are quite heterogeneous across different fields (Heinrich et al. 2011). After having panels and editorials on the practical impact of our research (Bichler et al. 2015) last year, we feel that the role and conception of theory in our field also deserves a more in-depth discussion. We are currently organizing a discussion section to which we have invited scholars from different BISE sub-fields to contribute their views and plan to publish the results in Issue 4/2016. We would like to take this as a starting point for further discussion and therefore encourage you to contribute to what will hopefully evolve into a fruitful and exciting dialogue.

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